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Total No. of Questions : 09

B.Tech.(ECE)/(EE/EEE)/(EIE) (Sem.–4)

DIGITAL ELECTRONICS

Subject Code : EC-204

Paper ID : [A0307]

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

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SECTION-A

1. **Write briefly :**

   a) Convert $(F48A)_{16}$ to octal code.

   b) Using the 8-bit code(including the sign bit), subtract $(47)_{10}$ from $(19)_{10}$ using the 2's complement.

   c) Why the NAND and NOR gates are commonly used in place of the AND and the OR gates?

   d) What is the advantage of using the hexadecimal equivalents of binary numbers when communicating with digital systems?

   e) List the advantages and disadvantages of CMOS gates.

   f) Draw the logic diagram for the logic function $Z = (A+B+C).D$

   g) What is the difference between static and dynamic RAM?

   h) What shortcomings does an SR flip-flop possess?

   i) What is a register? How it differs from a counter?

   j) What is meant by trailing-edge triggering?

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SECTION–B

2. A process is described by the logical expression :

   $Z = ABC + AC + A\overline{B}C$

   Find the expression for the minimal sum of products using K-map and implement the result with the logic gates diagram.

3. Design a multiplexer that can be used to generate the logical expression :

   $Z = A\overline{B} + B\overline{C}$

4. Illustrate the frequency division capability of the T flip-flop.

5. Develop the truth table for the half-subtractor and write the logical expressions for the difference and borrow terms. Also suggest a circuit for this kind of function.

6. What is a ring counter? What type of Flip-Flop is used in such counters? Write one application of this counter.

SECTION-C

7. Design an encoder which converts all the decimal digits to binary form. Write the binary logical expression for each output line.

8. How much computer memory (in bytes) would be required to store 10 seconds of a sensor signal sampled by a 12-bit A/D converter operating at a sampling rate of 5kHz?

9. A process is defined by the logical expression,

   $Z = AB + B\overline{C} + CD + B\overline{D} + BC$

   Reduce the above expression to minimum no. of literals using :

   a. Boolean algebra

   b. K-map

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